AD-A168 984 REQUIRED OPERATIONAL CAPABILITY (ROC) NUMBER LOG 21634 1/1
FOR A ROUGH TERRAIN CRANE (RTC)(U) MARINE CORPS
WASHINGTON DC 14 MAR 86 USMC-ROC-LOG-216.3.4
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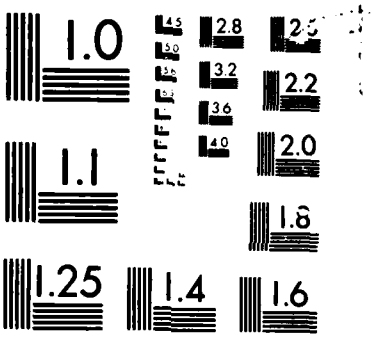
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DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380

3900
RDD24-05-30
14 MAR 1986

From: Commandant of the Marine Corps

Subj: REQUIRED OPERATIONAL CAPABILITY (ROC) NO. LOG 216.3.4 FOR A ROUGH TERRAIN CRANE (RTC)

Ref: (a) MCO 3900.4C

Encl: (1) ROC No. LOG 216.3.4

1. In accordance with the procedures set forth in the reference, ROC No. LOG 216.3.4 for a Rough Terrain Crane (RTC) is hereby established and promulgated.

2. The Commanding General, Marine Corps Development and Education Command (Director, Development Center), Quantico, Virginia 22134-5001 is the Marine Corps point of contact for any questions pertaining to this ROC and any development efforts pertaining thereto.

F. X. CHAMBERS, JR.
Colonel U. S. Marine Corps
Acting Deputy Chief of Staff for RD&S

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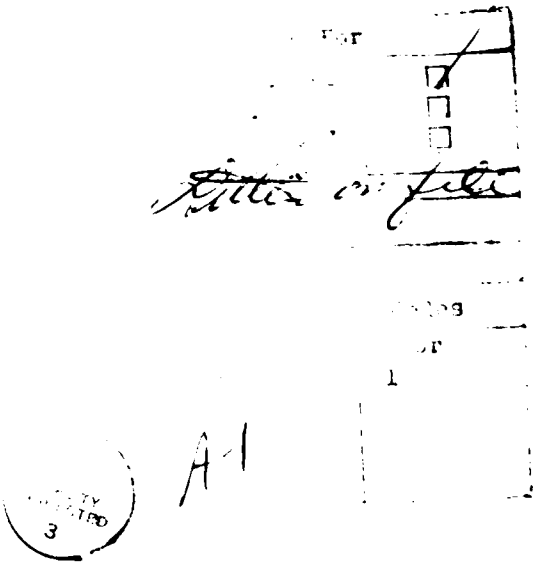

REQUIRED OPERATIONAL CAPABILITY (ROC) NO. LOG 216.3.4 FOR A ROUGH TERRAIN CRANE

1. STATEMENT OF REQUIREMENT. The Marine Corps has a requirement for a rubber tired, hydraulic boom, rough terrain crane (RTC). capable of lifting and swinging at least 30,000 pounds with the load center at a minimum distance of 5 feet from the fully extended outrigger. The RTC will be required to operate from a fixed pier or port; on and off airfield runways; and over unprepared and uneven surfaces, to include sand, snow, and mud. The required initial operational capability (IOC) is FY89. The desired full operational capability (FOC) is FY91.

2. THREAT AND OPERATIONAL DEFICIENCY

a. Threat. The threat confronting the Marine Corps is outlined in the Marine Corps Long Range Plan (MLRP) of May 1982 and the Marine Corps Midrange Objectives Plan (MMROP) of 29 April 1983. A specific threat does not exist which would be countered by the RTC.

b. Operational Deficiency. The RTC will replace the 30-ton crane (TAMCN: B0399) which is nearing the end of its service life.

3. OPERATIONAL AND ORGANIZATIONAL CONCEPTS

a. Operational Concept. The RTC will be utilized by the engineer organizations to support pile driving, excavating and other construction tasks, as well as handling repair parts, supplies, and equipment. The RTC will be utilized by the landing support battalion to load/unload breakbulk cargo from a fixed port or pier and from lighterage. The RTC must also be capable of being driven over primary and secondary highways.

b. Organizational Concept

(1) The RTC will replace the present 30-ton crane on a one-for-one basis.

(2) The estimated Marine Corps inventory objective for the RTC is 236. Quantity distribution is as follows:

Unit	Qty
I MAF	40
II MAF	40
III MAF	47
IV DWT	41

. Prepositioned War Reserve	5
. Maritime Prepositioned Ships (Total)	36
. Geo-Prepo	14
. General Support Forces	13
TOTAL	236

4. ESSENTIAL CHARACTERISTICS. The RTC is to be a commercial non-development item (CNDI) and will incorporate state-of-the-art technology to increase reliability, availability, maintainability, and service life expectancy.

a. RTC Performance Characteristics. The RTC will:

(1) Be capable of lifting and swinging at least 30,000 pounds with a load center at a minimum distance of 5 feet from the fully extended outrigger. Swing will be defined as 360-degree rotation at a speed of at least 1.5 revolutions per minute (rpm).

(2) Be equipped with a multi-section hydraulic boom. The retracted length shall be no longer than 30 feet, and the total extended length shall be at least 60 feet.

(3) Be capable of traveling forward on firm, flat ground at a speed of at least 15 mph and of executing a 360-degree turn within a maximum curb-clearance circle of 45 feet.

(4) Be equipped with two variable speed hoist winches capable of providing sufficient line pull to support the maximum rated load and operate the attachments. The winches shall be equipped with free fall and sufficient wire rope to allow for concrete bucket and clamshell bucket operations.

(5) Be equipped with no fewer than 16 ply-rated, pneumatic tires that provide sufficient traction and floatation to enable the RTC to operate in the various beach conditions found throughout the world, and on the Elevated Causeway System. The floatation index (FI) must not exceed 25 with or without rated load.

(6) Have a maximum curb weight not to exceed 60,000 pounds.

(7) Be equipped with an anti-two-block lock-out system to prevent damage to the boom, hook, and/or sheaves.

(8) Be capable of negotiating both an angle of approach and an angle of departure of at least 20 degrees, of negotiating the ramp of a landing craft at a longitudinal slope of at least 45 percent in both forward and reverse gears, at a speed of not less than 1.5 mph, and of negotiating at least a 20 percent cross slope.

(9) Be capable of stopping and then accelerating while ascending and descending a 45 percent longitudinal slope while in both forward and reverse gears. Service disc brakes must be capable of stopping and holding the crane on a 45 percent slope. The parking brake must restrain the crane on at least a 20 percent longitudinal slope.

(10) Be capable of traversing uneven and unprepared surfaces (rough terrain to include sand, snow, and mud) and of fording at least 60 inches of salt water, including wave action without fording kit.

(11) Be equipped with selected modes for front-wheel, all-wheel, and crab steering. An in-the-cab indicator shall show, at a glance, the steering position of the rear wheels.

(12) Be equipped with an environmentally controlled, enclosed cab to enhance operator performance in extreme climates. The cab must be of sufficient size to permit full mission performance by personnel (5 percent female to 95 percent male percentile) wearing the complete NBC protective ensemble, the environmental protective clothing, or body armor. The cab doors must be capable of being secured/latched in the open position. A cab-mounted rifle rack capable of accommodating the M-16 rifle rack is required to secure the operator's weapon.

(13) Have an overall height, measured to the highest point, not to exceed 138 inches (11.5 feet).

(14) Have an overall width not to exceed 120 inches (10 feet).

(15) Be resistant to corrosion during unprotected storage and from the effects of a salt water environment.

(16) Be capable of starting and operating in all climatic categories with ambient temperatures from -25°F to +125°F and in rain up to four inches per hour. It must also be capable of starting and operating in temperatures to -50°F with the use of a winterization kit. The winterization kit will consist of at least a personnel heater, a battery warmer, and/or engine oil warmer, fuel pre-heater, window defroster, and four tire chains.

(17) Be capable of providing adequate operator-adjustable lighting for night operations.

(18) Be equipped with a 24-volt negative-ground electrical system, the NATO standard electrical slave receptacle, and an engine-driven air compressor for the inflating of pneumatic tires.

(19) Be equipped with an on-demand all-wheel drive capability, a power shift-type transmission with transmission disconnect feature and a diesel engine. The engine must have a cold weather starting aid. The engine must be compatible with the Simplified Test Equipment-Internal Combustion Engine (STE-ICE) testing system. The crane must be easily maintained. Design should be such that maintenance and repair can be executed with common tools wherever possible. No unusual mechanic skill will be required at any echelon of maintenance. Both engine and transmission will have an oil sampling valve.

(20) Be capable of accepting military standard petroleum, oil, and lubricants (POL).

(21) Have a ground clearance of at least 15 inches.

(22) Be equipped with axles that can oscillate at least 10 degrees above and below the horizontal axle centerline that can be hydraulically locked to the frame to prevent oscillation.

(23) Be equipped with integral tie-down brackets, front and rear towing pintles, and appropriate lifting eyes.

(24) Be designed to meet applicable DoD human engineering, health, and safety standards and employ "user-friendly" features for personnel operating in or near the crane throughout the service life. The crane design and engineering must allow for certification to handle conventional and nuclear ordnance.

(25) Be capable of operating after exposure to chemical decontamination solutions, and shall incorporate seals and other synthetic components that are resistant to deteriorating bacteria. Nuclear survivability is not required.

(26) Be capable of being changed from the crane configuration to either the piledriving, concrete bucket, or clamshell bucket configuration in less than two hours. The piledriving attachment must be operated at a radius of at least 25 feet with the RTC on outriggers.

(27) Be compatible with standard commercial spreader bars.

(28) Be capable of being embarked and disembarked, without disassembly, from all roll-on/roll-off (RO/RO) ships, LST-1179, LSD-28, and LPD classes of ships.

(29) Be capable, under its own power, of embarking/disembarking through the surf from the LCU, LCM-8 landing craft, and LCAC.

b. Reliability, Availability, and Maintainability (RAM) Characteristics

(1) The minimum acceptable value (MAV) over the life of both cranes shall be at least 40 hours mean time between mission failure (MTBMF) with a confidence level of 85 percent and with no more than a .10 maintenance ratio (MR). The expected length of a mission for the RTC is 4.0 hours (1.2 for travel and 2.8 for lifting). A failure is defined as any malfunction that cannot be corrected by the operator within 20 minutes.

(2) The mean time to repair (MTTR) shall be no more than 1.5 hours at the organizational maintenance level and 3.0 hours at the intermediate maintenance level. The maximum time to repair at each of the above echelons of maintenance shall be no more than four and eight hours respectively.

(3) Scheduled preventive maintenance (except for operational checks) shall not be required more often than every 50 hours. Before/during/after operational checks will be conducted in accordance with the manufacturer's manuals.

(4) The crane shall be capable of completing at least 1000 hours of operation before replacement or rebuild of major components, such as the engine, transmission, power train, and hydraulic system is required.

5. INTRA/INTEROPERABILITY AND STANDARDIZATION REQUIREMENTS

a. The RTC will operationally interface with the movement of logistics over the shore and the movement of breakbulk cargo in rear areas.

b. The RTC will operationally interface with the movement of shelters, vans, and containers and, as such, must be compatible with standard commercial spreader bars.

c. The RTC will employ the NATO standard electrical slave receptacle and the Marine Corps STE-ICE testing system. The RTC shall be compatible with existing U.S. Navy ships and lighterage for water surface movement. The RTC will primarily affect Mission Area 216 (Combat Service Support).

6. RELATED EFFORT. The U.S. Army has both a 140-ton truck-mounted crane and a 250/300-ton truck-mounted crane to satisfy their heavy lift requirements for handling ISO containers on the beach. The U.S. Navy has a 150-ton mobile crane that supports container off-load at the Elevated Causeway Facility. The 140-ton truck-mounted crane is too large and exceeds Marine Corps operational limitations. Both the Army and Navy have stated requirements for cranes similar to those described herein which may meet Marine Corps requirements.

7. TECHNICAL FEASIBILITY AND ENERGY/ENVIRONMENTAL IMPACTS

a. Technical Feasibility. The RTC is technically feasible based on commercial designs and proposals. Although technically feasible, the fording of 60 inches of salt water is not a standard commercial requirement/practice. The technical risk of fielding the RTC is considered low.

b. Energy/Environmental Impact. The diesel engines that are designed for cranes of this type are commercially available and do not impact adversely upon the environment or upon the consumption of energy.

8. LIFE CYCLE COST FORECAST. The life cycle cost forecast and detailed cost estimate are attached as appendix A. The yearly operational time for the RTC is estimated to be 240 hours per year. Life expectancy: 10 years or 2,400 hours.

9. MANPOWER REQUIREMENTS. The RTC will be maintained by engineer equipment mechanics (MOS 1341) within the existing maintenance structure for engineer material handling equipment. It will be operated by engineer equipment operators (MOS 1345) within the existing Marine Corps manpower/force structure.

10. TRAINING REQUIREMENTS

a. Training Aids/Devices. None.

b. Training. Initial training for both operators and maintenance personnel will be provided by manufacturer/factory representatives. Eventually, this training will be accomplished at the appropriate military entry-level service school.

c. Manuals. Commercial operator and maintenance manuals will be utilized and supplemented by Marine Corps parts manuals (SL3 and SL4).

11. AMPHIBIOUS/STRATEGIC LIFT IMPACT. The RTC will have a negligible impact upon tactical and strategic mobility. It will weigh approximately 8,000 pounds less than, and have essentially the same square stowage envelope of, the 30-ton crane it is replacing.

Major System: ROUGH TERRAIN CRANE

Date: 02-25-1986

LIFE CYCLE COST FORECAST

FUNDING PROFILE
In Thousands of FY87 Constant Budget Dollars
(FYDP Dollars in Parentheses)

10 YEAR LIFE CYCLE

	PRIOR YEARS	CURRENT YEAR	BUDGET YEAR	FY88	FY89	FY90	FY91	FY92	TO COMPL'N	TOTAL PROGRAM
Major System										
RDT&E	0	0	0	0	0	0	0	0	0	0
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(0)	(0)		
PMC	0	0	31,770	43,408	30,795	0	0	0	84	106,056
FYDP Dollars		(0)	(31,770)	(45,399)	(33,642)	(0)	(0)	(0)		
BTYS FUNDED	0	0	71	97	68	0	0	0	0	236
Support										
Support PMC	0	0	0	0	0	0	0	0	249	249
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(0)	(0)		
MILCON	0	0	0	0	0	0	0	0	0	0
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(0)	(0)		
O&MMC	0	0	0	208	468	707	759	811	65,766	68,718
FYDP Dollars		(0)	(0)	(214)	(494)	(766)	(843)	(924)		
O&MMCR	0	0	0	0	98	104	161	168	3,261	3,792
FYDP Dollars		(0)	(0)	(0)	(105)	(115)	(184)	(198)		
MPMC	0	0	0	100	1,782	3,564	3,564	3,564	1,434	14,007
FYDP Dollars		(0)	(0)	(101)	(1,796)	(3,603)	(3,618)	(3,632)		
RPMC	0	0	0	0	20	131	141	156	226	675
FYDP Dollars		(0)	(0)	(0)	(20)	(134)	(145)	(162)		
NAVY PROC	0	0	0	0	0	0	0	0	0	0
TOTAL PROGRAM	0	0	31,770	43,716	33,162	4,506	4,625	4,700	71,019	193,498
FYDP Dollars		(0)	(31,770)	(45,713)	(36,057)	(4,619)	(4,791)	(4,916)		

Major System: ROUGH TERRAIN CRANE Date: 02-25-1986

LIFE CYCLE COST ESTIMATE

(In Thousands of FY87 Constant Budget Dollars)

10 YEAR LIFE CYCLE

PHASE/CATEGORY		SUBCATEGORY	CATEGORY	PHASE
I:	RDT&E PHASE			0
II.	INVESTMENT PHASE			107,200
1.	SYSTEM PRODUCTION/PROCUREMENT		107,200	
A.	Major End Item (Contractor)	91,271		
B.	Initial Provisioning/Spares, Repair Parts	9,429		
C.	Government Furnished/Added Equipment	0		
D.	Other Direct System Costs	6,499		
2.	SUPPORT EQUIPMENT PROCUREMENT		0	
A.	Ammunition	0		
B.	Weapons and Tracked Combat Vehicles	0		
C.	Guided Missiles	0		
D.	Comm-Elec Equipment	0		
E.	Support Vehicles	0		
F.	Engineer and Other Equipment	0		
3.	MILITARY CONSTRUCTION		0	
III.	OPERATIONS AND SUPPORT PHASE			86,298
1.	OPERATIONS		15,791	
A.	Operator Personnel/Training	10,236		
B.	Material Consumption	1,939		
C.	Energy Consumption	3,617		
2.	MAINTENANCE		67,821	
A.	Organizational Maintenance	9,468		
1)	Personnel/Training	2,229		
2)	Maintenance Material	1,034		
3)	Repair Material	5,817		
4)	Other	388		
B.	Intermediate Maintenance	3,568		
1)	Personnel/Training	1,125		
2)	Maintenance Material	0		
3)	Repair Material	1,861		
4)	Other	582		
C.	Depot Repair	41,096		
D.	Depot Overhaul	13,440		
E.	Unprogrammed Losses	249		
F.	Software Maintenance	0		
3.	INDIRECT SUPT, BASE OPS & MAINT, OTHER O/H COSTS		2,686	
A.	Base Operations	1,169		
B.	Other Overhead Costs	1,517		
4.	SUPPORT EQUIPMENT O&S		0	
TOTAL LIFE CYCLE COSTS				193,498

END

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